

What is claimed is:

1. A video information processing apparatus which receives interlaced video information, finds motion information on an interpolation pixel, and when the found motion information on the interpolation pixel is a still image, determines, as interpolation pixel information, pixel information found at the same position as the interpolation pixel in a field previous to a field containing the interpolation pixel, or when the found motion information on the interpolation pixel is a moving image, generates interpolation pixel information from pixel information found in the field containing the interpolation pixel and converts the interlaced video information into progressive video information, comprising:

video information storing means for storing the inputted interlaced video information for a plurality of fields;

reference pixel motion information generating means for generating motion information on each pixel of the plurality of fields from at least either one of the inputted interlaced video information and the video information stored in the video information storing means;

intrafield interpolation pixel motion information generating means for generating motion information on

the interpolation pixel from motion information on pixels contained in the same field as the interpolation pixel, from among the motion information on each pixel generated by the reference pixel motion information generating means;

interfield interpolation pixel motion information generating means for generating motion information on the interpolation pixel from motion information on pixels contained in fields previous and next to the interpolation pixel at the same position as the interpolation pixel, from among the motion information on each pixel generated by the reference pixel motion information generating means;

interpolation pixel motion determining means for determining motion information on the interpolation pixel from the motion information on the interpolation pixel generated by the intrafield interpolation pixel motion information generating means and from the motion information on the interpolation pixel generated by the interfield interpolation pixel motion information generating means; and

selecting means for selecting, according to the motion information on the interpolation pixel determined by the interpolation pixel motion determining means, either one of the pixel information found at the same position as the interpolation pixel in the field previous to the field containing the

interpolation pixel and the pixel information generated from the pixel information found in the field, and determining the selected one as the interpolation pixel information.

2. A video information processing apparatus according to claim 1, wherein the reference pixel motion information generating means includes interframe difference information detecting means for detecting difference information between frames from the inputted interlaced video information and from the video information stored in the video information storing means, and is operative to generate the motion information on each pixel from the difference information on the video information between the frames detected by the interframe difference information detecting means.

3. A video information processing apparatus according to claim 2, wherein the reference pixel motion information generating means includes interframe reference pixel motion information generating means for generating motion information on the reference pixel from the difference information on pixels contained in frames previous and next to the reference pixel at the same position as the reference pixel, which difference information has been detected by the interframe

difference information detecting means, and is operative to generate the motion information on the reference pixel.

4. A video information processing apparatus according to claim 3, wherein the interframe reference pixel motion information generating means determines the motion information on the reference pixel as a moving image when the difference information on the pixels contained in both previous and next frames at the same position as the reference pixel are difference information indicative of a moving image, and otherwise, determines the motion information on the reference pixel as a still image.

5. A video information processing apparatus according to claim 4, wherein: the intrafield interpolation pixel motion information generating means determines the motion information on the interpolation pixel as a moving image when motion information on a pixel to be referred to, which pixel is any one of the pixels contained in the same field as the interpolation pixel, is a moving image, and otherwise, determines the motion information on the interpolation pixel as a still image; the interfield interpolation pixel motion information generating means determines the interpolation pixel as a moving image when the motion

information on any of the pixels contained in the previous and next fields at the same position as the interpolation pixel is a moving image, and otherwise, determines the motion information on the interpolation pixel as a still image; and the interpolation pixel motion determining means determines the motion information on the interpolation pixel as a moving image when either the motion information on the interpolation pixel generated by the intrafield interpolation pixel motion information generating means or the motion information generated by the interfield interpolation pixel motion information generating means is a moving image, and otherwise, determines the motion information on the interpolation pixel as a still image.

6. A video information processing apparatus according to claim 5, further comprising: interpolation pixel motion information storing means for storing the motion information on the interpolation pixel generated by the interpolation pixel motion determining means for one frame period or a plurality of frame periods; and second interpolation pixel motion determining means for determining motion information on the interpolation pixel from the motion information on the interpolation pixel generated by the interpolation pixel motion determining means and from the motion information on the plurality of frames stored in the interpolation

pixel motion information storing means, the selecting means selecting, according to the motion information on the interpolation pixel determined by the second interpolation pixel motion determining means, either the pixel information found at the same position as the interpolation pixel in the field previous to the field containing the interpolation pixel or the pixel information generated from the pixel information contained in the field, and determining the selected one as interpolation pixel information.

7. A video information processing apparatus according to claim 6, wherein the second interpolation pixel motion determining means determines the motion information on the interpolation pixel as a moving image when both the motion information on the interpolation pixel determined by the interpolation pixel motion determining means and the motion information on the previous frame stored in the interpolation pixel motion information storing means are moving images, and otherwise, determines the motion information on the interpolation pixel as a still image; or the second interpolation pixel motion determining means determines the motion information on the interpolation pixel as a moving image when either the motion information on the interpolation pixel determined by the interpolation pixel motion

determining means or the motion information on the previous frame stored in the interpolation pixel motion information storing means is a moving image, and otherwise, determines the motion information on the interpolation pixel as a still image.

8. A video information processing apparatus according to claim 7, wherein the second interpolation pixel motion determining means determines motion information on an interpolation pixel of interest as a moving image when motion information on any of interpolation pixels contained in frames previous and next to an interpolation pixel of interest is a moving image, the motion information being among the motion information on the interpolation pixel determined by the interpolation pixel motion determining means and the motion information on the interpolation pixels contained in the plurality of frames stored in the interpolation pixel motion information storing means, and otherwise, uses the motion information on the interpolation pixel of interest stored in the interpolation pixel motion information storing means, without modification.

9. A video information processing apparatus which receives interlaced video information, finds motion information on an interpolation pixel, and when the

found motion information on the interpolation pixel is a still image, determines, as interpolation pixel information, pixel information found at the same position as the interpolation pixel in a field previous to a field containing the interpolation pixel, or when the found motion information on the interpolation pixel is a moving image, generates interpolation pixel information from pixel information found in the field containing the interpolation pixel and converts the interlaced video information into progressive video information, comprising:

video information storing means for storing the inputted interlaced video information for a plurality of fields;

reference pixel motion information generating means for generating motion information on each pixel from at least either one of the inputted interlaced video information and the video information stored in the video information storing means;

reference pixel motion information storing means for storing the motion information generated by the reference pixel motion information generating means for a plurality of fields;

intrafield interpolation pixel motion information generating means for generating motion information on the interpolation pixel from motion information on pixels contained in the same field as the interpolation

pixel, from among the motion information stored in the reference pixel motion information storing means;

interfield interpolation pixel motion information generating means for generating motion information on the interpolation pixel from motion information on pixels contained in fields previous and next to the interpolation pixel at the same position as the interpolation pixel, from among the motion information generated by the reference pixel motion information generating means and the motion information stored in the reference pixel motion information storing means;

interpolation pixel motion determining means for determining motion information on the interpolation pixel from the motion information on the interpolation pixel generated by the intrafield interpolation pixel motion information generating means and from the motion information on the interpolation pixel generated by the interfield interpolation pixel motion information generating means; and

selecting means for selecting, according to the motion information on the interpolation pixel determined by the interpolation pixel motion determining means, either one of the pixel information found at the same position as the interpolation pixel in the field previous to the field containing the interpolation pixel and the pixel information generated from the pixel information found in the field, and

determining the selected one as the interpolation pixel information.

10. A video information processing apparatus according to claim 9, wherein the reference pixel motion information generating means includes interframe difference information detecting means for detecting difference information between frames from the inputted interlaced video information and from the video information stored in the video information storing means, and is operative to generate the motion information on each pixel from the difference information on the video information between the frames detected by the interframe difference information detecting means.

11. A video information processing apparatus according to claim 10, wherein the reference pixel motion information generating means includes interframe reference pixel motion information generating means for generating motion information on the reference pixel from the difference information on pixels contained in frames previous and next to the reference pixel at the same position as the reference pixel, which difference information has been detected by the interframe difference information detecting means, and is operative to generate the motion information on the

reference pixel.

12. A video information processing apparatus according to claim 11, wherein the interframe reference pixel motion information generating means determines the motion information on the reference pixel as a moving image when the difference information on the pixels contained in both previous and next frames at the same position as the reference pixel are difference information indicative of a moving image, and otherwise, determines the motion information on the reference pixel as a still image.

13. A video information processing apparatus according to claim 12, wherein: the intrafield interpolation pixel motion information generating means determines the motion information on the interpolation pixel as a moving image when motion information on a pixel to be referred to, which pixel is any one of the pixels contained in the same field as the interpolation pixel, is a moving image, and otherwise, determines the motion information on the interpolation pixel as a still image; the interfield interpolation pixel motion information generating means determines the interpolation pixel as a moving image when the motion information on any of the pixels contained in the previous and next fields at the same position as the

interpolation pixel is a moving image, and otherwise, determines the motion information on the interpolation pixel as a still image; and the interpolation pixel motion determining means determines the motion information on the interpolation pixel as a moving image when either the motion information on the interpolation pixel generated by the intrafield interpolation pixel motion information generating means or the motion information generated by the interfield interpolation pixel motion information generating means is a moving image, and otherwise, determines the motion information on the interpolation pixel as a still image.

14. A video information processing apparatus according to claim 13, further comprising:
interpolation pixel motion information storing means for storing the motion information on the interpolation pixel generated by the interpolation pixel motion determining means for one frame period or a plurality of frame periods; and second interpolation pixel motion determining means for determining motion information on the interpolation pixel from the motion information on the interpolation pixel generated by the interpolation pixel motion determining means and from the motion information on the plurality of frames stored in the interpolation pixel motion information storing means, the selecting means selecting, according to the motion

information on the interpolation pixel determined by the second interpolation pixel motion determining means, either the pixel information found at the same position as the interpolation pixel in the field previous to the field containing the interpolation pixel or the pixel information generated from the pixel information contained in the field, and determining the selected one as interpolation pixel information.

15. A video information processing apparatus according to claim 14, wherein the second interpolation pixel motion determining means determines the motion information on the interpolation pixel as a moving image when both the motion information on the interpolation pixel determined by the interpolation pixel motion determining means and the motion information on the previous frame stored in the interpolation pixel motion information storing means are moving images, and otherwise, determines the motion information on the interpolation pixel as a still image; or the second interpolation pixel motion determining means determines the motion information on the interpolation pixel as a moving image when either the motion information on the interpolation pixel determined by the interpolation pixel motion determining means or the motion information on the previous frame stored in the interpolation pixel motion

information storing means is a moving image, and otherwise, determines the motion information on the interpolation pixel as a still image.

16. A video information processing apparatus according to claim 15, wherein the second interpolation pixel motion determining means determines motion information on an interpolation pixel of interest as a moving image when motion information on any of interpolation pixels contained in frames previous and next to an interpolation pixel of interest is a moving image, the motion information being among the motion information on the interpolation pixel determined by the interpolation pixel motion determining means and the motion information on the interpolation pixels contained in the plurality of frames stored in the interpolation pixel motion information storing means, and otherwise, uses the motion information on the interpolation pixel of interest stored in the interpolation pixel motion information storing means, without modification.

17. A video information processing method of receiving interlaced video information, finding motion information on an interpolation pixel, and when the found motion information on the interpolation pixel is a still image, determining, as interpolation pixel

information, pixel information found at the same position as the interpolation pixel in a field previous to a field containing the interpolation pixel, or when the found motion information on the interpolation pixel is a moving image, generating interpolation pixel information from pixel information found in the field containing the interpolation pixel and converting the interlaced video information into progressive video information, comprising:

a video information storing step of storing the inputted interlaced video information for a plurality of fields;

a reference pixel motion information generating step of generating motion information on each pixel of the plurality of fields from at least either one of the inputted interlaced video information and the video information stored in the video information storing step;

an intrafield interpolation pixel motion information generating step of generating motion information on the interpolation pixel from motion information on pixels contained in the same field as the interpolation pixel, from among the motion information on each pixel generated by the reference pixel motion information generating step;

an interfield interpolation pixel motion information generating step of generating motion

information on the interpolation pixel from motion information on pixels contained in fields previous and next to the interpolation pixel at the same position as the interpolation pixel, from among the motion information on each pixel generated by the reference pixel motion information generating step;

an interpolation pixel motion determining step of determining motion information on the interpolation pixel from the motion information on the interpolation pixel generated by the intrafield interpolation pixel motion information generating step and from the motion information on the interpolation pixel generated by the interfield interpolation pixel motion information generating step; and

a selecting step of selecting, according to the motion information on the interpolation pixel determined by the interpolation pixel motion determining step, either one of the pixel information found at the same position as the interpolation pixel in the field previous to the field containing the interpolation pixel and the pixel information generated from the pixel information found in the field, and determining the selected one as the interpolation pixel information.

18. A video information processing method of receiving interlaced video information, finding motion

information on an interpolation pixel, and when the found motion information on the interpolation pixel is a still image, determining, as interpolation pixel information, pixel information found at the same position as the interpolation pixel in a field previous to a field containing the interpolation pixel, or when the found motion information on the interpolation pixel is a moving image, generates interpolation pixel information from pixel information found in the field containing the interpolation pixel and converting the interlaced video information into progressive video information, comprising:

a video information storing step of storing the inputted interlaced video information for a plurality of fields;

a reference pixel motion information generating step of generating motion information on each pixel from at least either one of the inputted interlaced video information and the video information stored in the video information storing step;

a reference pixel motion information storing step of storing the motion information generated by the reference pixel motion information generating step for a plurality of fields;

an intrafield interpolation pixel motion information generating step of generating motion information on the interpolation pixel from motion

information on pixels contained in the same field as the interpolation pixel, from among the motion information stored in the reference pixel motion information storing step;

an interfield interpolation pixel motion information generating step of generating motion information on the interpolation pixel from motion information on pixels contained in fields previous and next to the interpolation pixel at the same position as the interpolation pixel, from among the motion information generated by the reference pixel motion information generating step and the motion information stored in the reference pixel motion information storing step;

an interpolation pixel motion determining step of determining motion information on the interpolation pixel from the motion information on the interpolation pixel generated by the intrafield interpolation pixel motion information generating step and from the motion information on the interpolation pixel generated by the interfield interpolation pixel motion information generating step; and

a selecting step of selecting, according to the motion information on the interpolation pixel determined by the interpolation pixel motion determining step, either one of the pixel information found at the same position as the interpolation pixel

in the field previous to the field containing the interpolation pixel and the pixel information generated from the pixel information found in the field, and determining the selected one as the interpolation pixel information.